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THE
NEWTONIAN SYSTEM
OF THE
WORLD,

THE BEST
Model of Government:
An *Allegorical* POEM.

With a plain and intelligible Account of the
System of the World, by Way of *Annotations*:

With COPPER PLATES:

To which is added,

25
CAMBRIDG' COMPLAINT

Against the *Intercalary* Day in the Leap-Year.

By J. T. DESAGULIERS, LL. D. Chaplain to His Grace
the Duke of CHANDOS, and F. R. S.

WESTMINSTER:

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THE NEW TOWN SYSTEM
OF THE
WORLD



Model of the World

With a plan and description of the
System of the World

Wm. Gutter Printer

CAMBRIDGE

Against the Year 1791

Printed by Wm. Gutter

C. 1. 1. 1.



To the RIGHT HONOURABLE
The EARL of ILA Y, &c, &c, &c.

MY LORD,

8 Ni

25-



HO' I never made *Politicks* my Study, but always thought it my Duty rather to take Care to be obedient my self, than to look into the Management of my Superiors; yet, among my Philosophical Enquiries, I have consider'd *Government* as a *Phænomenon*, and look'd upon that Form of it to be most perfect, which did most near'y resemble the Na-
A 2 tural

tural Government of our *System*, according to the Laws settled by the *All-wise* and *Almighty Architect* of the Universe.

THOSE Philosophers who wanted Observations and Mathematicks, or wou'd not make Use of them, have given us such incoherent *Hypotheses* concerning Cælestial Appearances, and the Causes of the Motions of the heavenly Bodies; that the very worst Form of Government cannot be so inconvenient to those who live under it, as the wild Notions of such Philosophers are shocking to unprejudic'd Reason and common Sense.

BUT when the incomparable Sir *Isaac Newton* gives us Facts and Demonstrations, instead of Suppositions and Conjectures, how is the Mind charm'd with the Beauty of the System? What Traces of Divine Wisdom do we see in the most regular Action of universal *Gravity*, (or Attraction) whose Power is diffus'd from the Sun to the very Centers of all the Planets and Comets, and acts upon the most distant of those Bodies, in as mathematical a Manner as it does upon the nearest? How wonder-

D E D I C A T I O N.

v

wonderfully does it bring back the Comets from their immensely distant *Aphelion*, in their very long Ellipses, by the same Laws that it keeps the nearest Planet *Mercury* in its Orbit: The former describing *equal Areas in equal Times* round the Sun, as regularly as the latter, whilst Gravity always checks the Projectile Force, (whereby the Bodies tend to fly from the Sun) in Proportion to the Quantity of that Force.]

THE *limited Monarchy*, whereby our Liberties, Rights, and Privileges are so well secured to us, as to make us happier than all the Nations round about us, seems to be a lively Image of our System; and the Happiness that we enjoy under *His* present MAJESTY'S Government, makes us sensible, that *ATTRACTION* is now as universal in the Political, as the Philosophical World.

YOUR LORDSHIP'S consummate Knowledge of the *Laws of Nature* which are establish'd in the Heavens, as well as that of the *Laws of Nations*, and particularly those of *Great Britain*, makes the Patronage of this Poem Your undoubted Right.

Y O U R

YOUR Lordship can best judge, whether the *Allegory* be just; and it is by Your Lordship's Approbation that I desire to stand or fall: Only begging, that the Truth of the Philosophy may excuse the Badness of the Poetry.

INSTEAD of attempting Your Lordship's Character, which wou'd require an abler Pen than mine, and even then offend Your Lordship, by doing Justice to Your Merits; I shall only beg Leave to return my humble Thanks for the Freedom and Goodness with which Your Lordship has always receiv'd me; and tho' Your Lordship is pleas'd to lay aside Your Quality in Condescension to me, I shall always be sensible how great an Honour is conferr'd on,

MY LORD,

Your Lordship's

most oblig'd, and

most humble Servant,

J. T. D.



P R E F A C E.



THE Universal Joy that fill'd all *English* Hearts at His present MAJESTY'S Accession to the Throne, had so strong an Effect upon me, as to draw me from the serious and rugged Researches of *Philosophy*, to the lighter and more agreeable Amusement of *Poetry*.

THUS influenc'd, I was resolv'd to endeavour at something that might at once shew my Zeal and Loyalty, and at the same Time divert Her most Gracious Majesty with my first Poetical Experiment, as I have had the great Honour of entertaining Her with Philosophical ones. The following Poem was wrote last Summer, and intended to be publish'd on the Day of the *Coronation*: Bnt when I consider'd that several Astronomical Terms and Allusions wou'd want explaining to such Readers as had not been

P R E F A C E.

been conversant in the Cœlestial Science, I resolv'd to add a few Notes, tho' they were not necessary to those Great Persons, for whom my Poem was chiefly design'd. Then again, remembering that it is a common Saying, that *Philosophers are the worst of Poets*, and yet, being unwilling to suppress the first Offspring of my Muse, I enlarg'd my Annotations, and illustrated them with Copper Plates, so as to give a full Account of the System of the World, in a plain, and intelligible Manner, together with a Confutation of those false *Hypotheses* which have sometimes obtain'd among learned Men. Thus have I *tack'd* my Poetry to Philosophy, to make it go down; and tho' it shou'd be thrown out by a *Majority*, I hope, by this Expedient, to gain a sufficient Number to keep it from being waste Paper.

CAMBRIA's Complaint was written since the Astronomical Poem was in the Press.

WHEN I consider'd the *First of March*, as my own *Birth-Day*, I was indeed displeas'd at the *Intercalary Day*, which puts it off once in four Years, but bore it with Patience, because the *Bissex-tile* was settled by Astronomers; but as it is *Her Sacred MAJESTY's Birth-Day*, and thus delay'd in the first Year of Her Reign, I cou'd no longer bear it; and therefore, to revenge the Affront offer'd to the ROYAL CONSORT by an intruding Day, I invok'd the Muse to complain, in the Person of *Cambria*, with all the Wrath and just Resentment, becoming the tutelar Goddess of that Principality.

T H E



T H E
N E W T O N I A N S Y S T E M *of the* W o r l d
T H E B E S T
M O D E L *of* G o v e r n m e n t .

A N
Allegorical P O E M .



N Ancient Times, ere Bribery began
To taint the Heart of undesigning
Man,
Ere Justice yielded to be bought and
fold,

When Senators were made by Choice, not Gold,

B

Ere

5. Ere yet the Cunning were accounted Wise,
 And Kings began to see with other's Eyes;
Pythagoras his Precepts did rehearse,
 And taught the System of the Universe;
 Altho' their Observations then were few,
 10. Just were his Reasonings, his Conjectures true :

Men's

VERSE 8. *And taught the System of the Universe;*

THE System of the Universe, as taught by *Pythagoras*, *Philolaus*, and others of the Ancients, is the same, which was since reviv'd by *Copernicus*, allow'd by all the unprejudic'd of the Moderns, and at last demonstrated by Sir *Isaac Newton*. The first Figure will give a clear Idea of it. All the Difference between the modern and ancient System, is only what is added to it since the Invention of the Telescope, viz. *The four Satellites, or Moons of JUPITER, discover'd by Galileo*: *The Ring of SATURN (a thin flat Body encompassing it without touching) and one of his Satellites discover'd by Huygens, and the other four Satellites of that Planet first seen by Cassini*; the Phases of *VENUS* and *MERCURY*, like those of the Moon, these Planets appearing full, when they are beyond the Sun, halv'd when at their greatest apparent Distance (or *Elongation*) from the Sun, as at the Points *P, Q*; (*Fig. 1.*) and horned, as they pass between the Sun and the Earth, not directly in a Line with the Centre of the Earth and Sun; because, then they lose all their Light in Respect of us, and appear like black Spots passing across the Sun's Face, or *Disk*, as *VENUS* is drawn in this Figure. Lastly, The Orbit of a Comet, which was first settled by Sir *Isaac Newton*, who has given us a Method from three Observations to determine the Path of a Comet, so as to be able to know where a Comet will pass as long as it is visible; how near it will go to the Sun; with what encreasing Velocity it will approach towards it; and with what decreasing Velocity it will recede from it, after

Men's Minds he from their Prepossessions won,
 Taught that the Earth a double Course did run,
Diurnal round it self, and *Annu'al* round the Sun,
 That the brightGlobe, from his Æthereal Throne,
 With Rays diffusive on the Planets shone, } 15
 And, whilst they all revolv'd, was fix'd alone.
 What made the Planets in such Order move,
 He said, was Harmony and mutual Love.
 The Musick of his Spheres did represent
 That ancient Harmony of Government : 20.

B 2

When

after it has pass'd by it. Dr. *Halley* has settled the whole Time of the Revolution of some of the Comets, so as to be able to foretel their Return, and to describe that remaining Part of their Orbit, in which they are invisible by Reason of their great Distance from the Sun which enlightens, and from us who should see them.

VERSE 19. *The Musick of his Spheres did represent.*

THE Harmonical Proportion, which *Pythagoras* observ'd to obtain in the Motion of the Heavenly Bodies, was taken to be real Musick by the Ignorant; who fancy'd, that the Spheres (or hollow Spherical Shells, sup-
 pos'd

When Kings were not ambitious yet to gain
 Other's Dominions, but their own maintain;
 When, to protect, they only bore the Sway,
 And Love, not Fear, taught Subjects to obey.

25. But when the Lust of Pow'r and Gold began
 With Fury, to invade the Breast of Man,
 Princes grew fond of arbitrary Sway,
 And to each lawless Passion giving Way,
 Strove not to merit Heaven, but Earth possess'd,
 30. And crush'd the People whom they should
 have blest'd.

Astronomy then took another Face,
 Perplex'd with new and false *Hypotheses*.

Usurping

pos'd to carry the Planets in them) rubbing against one another, produc'd
 melodious Sounds, but that the Musick could not be heard, by reason of
 the great Distance.

Ufurping *Ptolemy* depos'd the Sun,
And fix'd the Earth unequal to the Throne.

This *Ptolemaick Scheme*, his Scholars saw, 35.

No way agreed with the *Phænomena*:

But

VERSE 33. *Ufurping Ptolemy depos'd the Sun, &c.*

Ptolemy suppos'd the Earth to be in the Center of the World, encompass'd with many Orbs or Spheres, one within another. The first immediately compassing the Earth, he called the Sphere of *Air*, the next the Sphere of *Æther*, then the Sphere of *Fire*: After followed seven other Solid Transparent Shells, which were said to carry the Planets in them, from West to East in the following Order, viz. the *Moon*, *Mercury*, *Venus*, the *Sun*, *Mars*, *Jupiter*, and *Saturn*; then a Sphere called the *Primum Mobile* (or first Mover) encompassing all, and supposed to carry the whole Machine of the Universe round from East to West, in 24 Hours, without disturbing the particular Motions of each Sphere. But afterwards, for solving some apparent Motions in the Heavens, not taken notice of before, the Followers of *Ptolemy* contrived three other Spheres or *Heavens*, between *Saturn's* Heaven and the *Primum Mobile*, which he calls the First, Second, and Third *Chrystalline*.

The second Figure represents the *Ptolemaick* System, wherein we have omitted the three *Chrystallines*, and the Spheres of *Air*, *Æther* and *Fire*, to avoid Confusion.

But yet resolv'd that System should obtain,
 Us'd all their Arts his Tenets to maintain;
 A Revolution in the Earth to shun,
 40. Immense Velocity they gave the Sun;

Then

VERSE 37. *But yet resolv'd that System should obtain,
 Immense Velocity thus gave the Sun*

THE *Ptolemaick System* was very well receiv'd among the Vulgar, and such as were not accustom'd to consider the Difference between *apparent* and *real* Motion. If a Man, who had never seen or heard of a Ship, should be carried into the Cabin of a large Man of War with his Eyes blind-folded; and whilst the Ship was sailing with a steady Motion, should have the Bandage taken off, he would not be sensible of his being carried along; but would imagine Rocks, Buoys, and other fixed Objects, which he passed by, to be carried the contrary way; and, if he did not reflect, he would think the very Shores, with the Trees, and Houses, also to move. So the unphilosophical part of Mankind, (who look upon the *Sun* and *Moon* to be but small Bodies, and the Planets and fixed Stars much smaller, whilst they believe the Earth to be immensely greater, and alone to deserve the Name of the *World*) cannot conceive their own Habitation to move, but look upon such as assert it to be ridiculously whimsical, or to design to impose upon Mankind with a Cant of hard Words, and out of the way Notions. But when *Astronomers* found by the *Sun's* great Distance and apparent Magnitude, that he must be far greater than the Earth; then they thought it, (at least) as reasonable to solve the Appearances of Day and Night, and of the Seasons by attributing the Motions to the Earth, One about its *Axis* in twenty four Hours to explain the first, and another about the Sun in a Year to account for the last. But such as would always have the Holy Scriptures taken in a literal Sense (as if the *Divine Revelation*, which was given us to teach us Morality, and our Articles of Faith, had also been intended to instruct us in Philosophy)

Then *Solid Orbs* with strain'd Invention found,
To shew how *Planets* might be carry'd round.

But

losophy) quoting several Passages to disprove the Motion of the Earth, declared it *Heresy* to assert that it moved; and therefore chose rather to quit the greater Probability, and find Expedients to maintain the contrary Opinion. For the Objection against the Motion of the Earth, by Reason of its Weight and Bulk, vanishes at once when we consider that the Sun is about ten Hundred Thousand times bigger, and above two Hundred Thousand times heavier; and that, to produce only the Different Seasons, it must, in the Space of one Year, run through an Orbit whose Semidiameter is above eighty Millions of Miles long; but when Day and Night comes to be considered, then the Sun must be supposed to run through that whole Orbit in twenty four Hours, which is a Motion incredibly swift, being three Hundred and sixty five times swifter than the Annual Motion of the Earth, or 540666 Miles in one Minute, which is 25200 Times swifter than a Cannon Ball: Whereas a Revolution of the Earth about its *Axis* in 24 Hours, will as clearly explain that *Phænomenon*.

THE System of *Tycho Brahe*, who supposes all the Planets except the *Earth* and *Moon* to Move round the *Sun*, and yet that the vast *Sun* with all of them revolving about him is carried round our little Globe of Earth, is so absurd, that the bare sight of the Scheme (*Figure 3d*) is enough to confute that Supposition. Neither have I made any mention of it in the *POEM*; because we can never suppose any Thing to have happened in any Government so improbable, as that a Powerful *Sun* should be so far influenced by a *Planet* as to be carried about at his Pleasure; when at the same time the other great Officers move regularly in their Orbits, especially when they have *Mars* amongst them.

But when th' Observers, who the Heav'ns sur-
vey'd,

Perceiv'd the *Planets* sometimes *retrograde*,
Sometimes *directly* mov'd with *hasty Pace*, 45.
Sometimes more *slow*, then *stopping* in their Race,

For

VERSE 44. *Perceiv'd the Planets sometimes retrograde,*
Sometimes directly mov'd with hasty Pace,
Sometimes more slow, then stopping in their Race, &c.

THE Planets, in reality, are always direct; that is, Move according to the Order of the Signs, running through the *Constellations* from *Aries* to *Taurus*, and so on through *Gemini*, *Cancer*, &c. but by reason that the Observer is carried along with the Earth on which he stands, whilst he is insensible of his own Motion, the *Planets* appear to him to go sometimes *backward* among the *fix'd Stars*, and sometimes to go much *faster*, then much *slower*, and also now and then to *stand still*, (that is to keep the same apparent Distance in respect to the *fixed Stars* about them) in which different Cases they are said to be either *Direct*, *Retrograde* or *Stationary*, as may be seen in Fig. 4 and 5.

THE 4th Figure shews the apparent Irregularity of *Mars's* Motion, which will serve to explain the Cause of those Appearances in the other two superior Planets, viz. *Jupiter* and *Saturn*.

BUT for the sake of such Readers as are wholly unacquainted with *Astronomy*, I beg leave to begin with the Explication of some Things necessary to be known, before I consider these *Stations* and *Retrogradations*, &c.

WHEN we look out in a clear Night, we may distinguish the *Planets* from the *fixed Stars* by their not twinkling as the *fixed Stars* do, (or what is more certain) by the *Telescope*, which will magnifie them, whilst the
fix'd

For this, Expedients must invented be,
 That, with it self, their System may agree,
 And keep some shew of Probability.

C

Within

fix'd Stars are not magnified, but rather diminished by it. The Observations of one Night or two only shew us such *Planets* as we then see together with the *fixed Stars* about them rising in the East, getting to their greatest Height in the South, and setting in the West, as we see the *Sun* do in the Day time, and the *Moon* those Nights when it shines.

THIS seems to be performed by a Motion of the whole Concave of the Heavens in 24 Hours, call'd by *Ptolemy* the Motion of the first Mover (*Primum Mobile*) but that Motion is only such apparently; for it is the Revolution of the Earth about its own Center the contrary way, (*viz.*) from West to East) in the same Time, which causes the Appearance of Rising and Setting, in the Heavenly Bodies.

Now when we come to take notice of the *Moon*, or any other of the *Planets* for several Nights successively, we find that those Bodies do not appear to Rise and Set and Move along with the same Stars, but creep on softly towards the East, so as to Rise and Set later than the Stars which they accompanied before. This is called the *Proper Motion* of the *Planets*, and is owing to their revolving about the *Sun*, in Orbits that are nearly circular, which Revolution they always perform in a certain Period of Time, *viz.* *Mercury* in 87 Days, or near three Months; *Venus* in 224 Days, or a little more than seven Months; the *Earth* (which makes the *Sun* seem to move just in the same Manner) in a Year; *Jupiter* in almost twelve Years, and *Saturn* in almost Thirty; and the *Moon* moves about the Earth in twenty seven Days, and about seven Hours.

IF an Observer were removed from the Earth, to the Center of the *Sun*, and supposed to have the Prospect of the Heavens from thence, he would

Within their thicken'd Orbs new Orbs they
made,

Each *Deferent* its *Epicyle* had,

So round the Earth the *Planets* still convey'd.

50.

Wheels

would see all the *fix'd Stars* in the same Order, and of the same apparent *Magnitude* as we see them from the Earth; for though the Distance from us to the *Sun* is above 80 Millions of Miles, yet all that Distance is but as a Point when compared with the Distance of *fix'd Stars*.

Now such an Observer would lose sight of what we call the *Diurnal Motion*, and only behold the *Planets* shifting their Places among the *fix'd Stars* in regular Orbits, or Ovals nearly circular, which though different from one another, yet all of them have the *Sun* for their Center (or rather, in Terms of Art, the *Sun* is in one of the two *Foci* of those Orbits) and take up but a very small Breadth in the Heavens, which Breadth or Belt is called the *Zodiac*.

If a Line be supposed to be drawn from the Observer's Eye, through the Center of the *Planet*, quite to the *fix'd Stars*, the Place where that Line terminates among the *fix'd Stars* is called the *Place of the Planet* --- *Heliocentrick* Place, if the Observer be supposed in the Center of the *Sun*; *Geocentrick* Place, supposing the Observer in the Center of the Earth. If the *Planets* were near the *fix'd Stars*, vastly distant both from the *Sun* and the Earth, the *Heliocentrick* and *Geocentrick* Places would always be nearly the same; but as they are very near the *Sun*, and one another, in comparison of the Distance of the *fix'd Stars* (*Saturn* the most remote) not being 10 times farther from the *Sun*, than the Earth) the *Heliocentrick* and *Geocentrick* Place of the *Planets* must differ very much sometimes, and never be precisely the same, but when the *Sun*, *Earth* and *Planet*, have their three Centers directly in a Line.

S I N C E

Wheels within Wheels complex'd, they thus involve,

And yet Appearances but falsely solve.

C 2

Like

SINCE then, as I have already said, the *Planets* if seen from the *Sun*, would appear to move perfectly regular (only appearing to be largest in their *Perihelion*, or when nearest the *Sun*; and least in their *Aphelion*, or when farthest from it) it is plain that as we see them from the *Earth*, the shifting of the Observer's Place, as well as that of the *Planet*, must give their regular Motion very irregular Appearances: Accordingly *Astronomers*, when they came more nicely to observe the proper Motion of the *Planets*, found that as they went Eastwards among the *fix'd Stars*, they mov'd sometimes faster, and sometimes slower; that they sometimes continued in the same Place, (that is rose, set, and appeared to be carried among the same Stars) for some Days; nay, that sometimes they moved towards the West among the Stars, and therefore said that the *Planets* were *Direct*, *Stationary* and *Retrograde*; whilst the *Moon* (because it does really move round the *Earth*) has none of those Appearances.

THIS gave a great Shock to those who believed the *Earth* to be fixed in the Center of the World; but it is easily accounted for, when once the *Diurnal* and *Annual* Motion of the *Earth* are allowed. For Example, Let us suppose *Mars* (Fig. 4.) to be at B, and to move from West to East, that is from B, to D, F, K, P, &c. If seen from the *Sun*, *Mars* will appear among the *fix'd Stars*, to move according to the Order of the Signs, viz. from α to μ , ϕ , and so on to ψ , ω , &c. through the twelve Parts of the *Zodiac* distinguished by the said Signs or Characters, in a very regular Manner; but the Appearances will be quite otherwise, when that *Planet* is seen from the *Earth*. The *Earth* being at A, and *Mars* at B, *Mars* will appear at α among the *fix'd Stars*, the *Heliocentrick* and *Geocentrick* Place being the same; but when the *Earth* has moved from A. to o, as *Mars* moves slower than the *Earth*, he will only move from
B to

B to *D*, and (seen from the *Sun*) shift his Place from ϖ to m through the Arc ϖm , but seen from the Earth it will appear to have gone faster, viz. through the Arc $\varpi 1$: then when the Earth is got to *E*, *Mars* will only be got to *F*, its *Heliocentrick* Place being *a*, as it has describ'd among the fix'd Stars the Arc $m a$; but its *Geocentrick* Place is 2, and (seen from the Earth) it will appear to have moved much faster describing the Arc 1 2.

WHILST the Earth moves from *E* to *G*, *Mars* will move from *F* to *H*, its *Heliocentrick* Motion, (which is uniform) being from *a* to *b*; but seen from the Earth, it has not appeared to move at all but has been Stationary in its *Geocentrick* Place 2.

As the Earth moves from *G*, through *I*, to *L*, *Mars* in his Orbit moves from *H*, through *K*, to *M*, describing among the fix'd Stars by its *Heliocentrick* Motion the Arc *b c*; but seen from the Earth, it will appear to have described the Arc 2 3. by a *Retrograde Motion*, or contrary to the Order of the Signs, that is from East to West.

AND here it is to be observed, that in this Motion, when *Mars* was at *K*, and the Earth at *I*, the *Heliocentrick* and *Geocentrick* Place was the same, viz. at ϖ .

As the Earth goes from *L* to *N*, and *Mars* from *M* to *O*; *Mars* (seen from the Earth) will all the while appear Stationary at 3, though its *Heliocentrick* Motion has been from *c* to *d*.

LASTLY, as the Earth moves from *N* to *A*, while *Mars* goes from *O* to *P*, and its *Heliocentrick* Motion is from *c* to *d*, the Planet (seen from the Earth) does again become direct, and seems to move from 3 to 4, and so on.

IT will not be improper to shew here, how the *Sun*, as it is seen from the Earth, appears to describe the same Orbit, that the Earth doth really describe, without *Stations*, or *Retrogradations*.

WHEN the Earth is in *R* (its *Heliocentrick* Place being in ϖ) the *Sun* appears to be in γ ; and as the Earth goes through the Points *l*, *m*, *I*, *K*, *N*, *A*, *e*, *o*, *f*, *g*, *b*, *R*, in its Orbit (its *Heliocentrick* Place moving according to the Order of the Signs) the *Sun*'s Place will also go thro' the
the

the Points γ , δ , Π , ϵ , Ω , μ , ζ , η , θ , ι , κ , likewise according to the Order of the Signs, but always appearing in the Sign opposite to that in which the Earth is.

IF it be asked how we know the *Sun* to be in such and such Signs, since we cannot see the *fix'd Stars* by Day; we answer, that, that Part of the Heavens which we see in the South at Midnight is directly opposite to that Part in which the *Sun* has appeared at Noon, as might have been perceiv'd if there had been a total Eclipse, or we had made use of a long *Telescope* in a dark Room, to see the *Stars* that were about the *Sun*. As for Example, If an Observer in the enlightened Part of the Earth at *R*, cannot (by reason of the great Light of the *Sun*) see the *Stars* of *Aries* (γ) when the *Sun* is in that *Constellation*; the same Observer will be carried to *q* at Midnight, by half a Turn of the Earth upon its *Axis*, from whence seeing *Libra* (ζ) in the South, he will judge with certainty that the *Sun* is then in *Aries* (γ) the opposite Sign.

MERCURY and *Venus* the *inferior Planets*, (so called because they are nearer to the *Sun* than the Earth is) have also their *Stations* and *Retrogradations*, as seen from the Earth, which must be explained by a different Scheme. See the 5th *Figure*, where the Appearances of *Mercury* are exhibited; which will serve to explain those of *Venus*.

WHEN the Earth is at *A*, and *Mercury* at *a*, that *Planet* appears among the *fix'd Stars* at 1; and as the Earth moves from *A* to *B*, *Mercury* which moves faster, will go in its Orbit from *a* to *b*, and appear to have mov'd among the *fix'd Stars*, from 1 to 2, according to the Order of the Signs, or from West to East, being then said to be *Direct*.

WHILST the Earth moves from *B* to *C*, and *Mercury* from *b* to *c*, *Mercury* is *Stationary*, not appearing to move out of the Point 2; but as the Earth moves from *C* to *D*, and *Mercury* from *c* to *d*, it appears to describe the Arc 2 8 among the *fix'd Stars*, by a Motion from East to West, or contrary to the Order of the Signs, and therefore it is then *Retrograde*.

As the Earth moves from *D* to *E*, and *Mercury* from *d* to *e*, it becomes *Stationary* at 8. Lastly, as the Earth moves from *E* to *F*, and *Mercury*

cury from *e* to *f*, *Mercury* does again become *Direct*, appearing to move in the *Arc* 8 3, from West to East.

THE Defenders of the *Ptolemaick Hypothesis* were sadly put to it, to give the least probable Account of the *Stations* and *Retrogradations* of the *Planets*. Their Solid Transparent Orbs, or Chrystal Shells, by way of Expedient, they supposed to be much thicker than was at first imagined (see *Fig. 2d.*) and within their Thickness placed little Circles, call'd *Epicycles*, supposing the *Planet* to go round in the *Epicycle*, whilst the Orb call'd a *Deferent* (or *Excentrick* because the Earth was supposed not to be exactly in its Center) went round from West to East, carrying round the *Epicycle*, together with the *Planet* moving in it: Only the *Sun's* and *Moon's* Orb had no *Epicycle*.

SUPPOSE *Mercury's* Orb (in this 2d Scheme to move from West to East, and that *Mercury* being in the *Epicycle* at *A* moves faster from *A* to *B*, than the *Deferent* carries its *Epicycle*, then *Mercury* will appear *Retrograde*. Whilst a *Planet* (see *Venus's* Orb) moves in its *Epicycle* from *E* to *F*, it appears *Stationary*; but when it moves from *C* to *D*, (see *Mars's* Orb) it will be *Direct*, and have its greatest Velocity: And all the *Planets* must appear smaller in their *Apogee* (or greatest Distance from the Earth) and biggest in their *Perigee*, or least Distance. But when the Times and Places of the *Stations* and *Retrogradations*, and the different apparent Magnitudes of the *Planets* came to be nicely observed; the *Ptolemaicks*, to make their *Hypothesis* or Supposition agree with the Observations, were forced to enlarge some of their *Epicycles*, so as to make a monstrous System, especially in regard to *Mars*, where the *Epicycle* must be larger than the *Deferent* in order to solve the *Phænomena*, or Appearances of that *Planet*.

THESE and other Absurdities, made King *Alphonfus* say to some *Astronomers*, who were explaining to him the *Ptolemaick System*-----that, if he had been GOD, he would have made the World, in a more plain and simple Manner; which he said rather to ridicule those *Philosophers*, than out of any Spirit of Prophaneness.

Like *Peter's* Coat, the System burthen'd grew, 55.
Keeping old Fashions, adding still the new.

But when Philosophers explor'd the Skies,
With *Galilæo's* new-invented Eyes ;
In *Mercury* and *Venus*, then were shewn
Phases like those of the inconstant *Moon*: 60.

And

VERSE 55. *Like Peter's Coat, the System burthen'd grew,
Keeping old Fashions, adding still the new.*

See the Story of Lord *Peter* in Dr. S---ts Tale of a Tub.

VERSE 58. *With Galilæo's new-invented Eyes.
Telescopes.*

VERSE 60. *Phases like those of the inconstant Moon.*

THE *Phases* of *Mercury* and *Venus*, whereby they seem horned, halv'd and full, and *Mercury* and *Venus*, appearing as Spots upon the Face of the *Sun*, as they pass in a direct Line between the *Sun* and *Earth*, and their never being in Opposition to the *Sun* (that is on the other Side of the *Earth*) shews that those Bodies do indubitably move round the *Sun*, as has been explained in Annotation to *Verse* the 8th, and shewn in the first Figure.

And, like black Patches, crossing *Phæbus* Face,
 These two inferior Globes were seen to pass;
 Which shew'd the right of *Sol* to hold the central
 Place.

Comets, (no longer *Meteors* to be fear'd,
 As threatning Vengeance with their Tail or
 Beard.)

65.

By Telescopes, were, lasting Bodies, prov'd,
 Like *Planets*, in revolving Orbits mov'd,

Whose

VERSE 64. *Comets, no longer Meteors to be fear'd.*

SEE Dr. *Halley's* Verses on Sir *Isaac Newton's* Principia. The Third Edition.

Jam patet, horrificis quâ sit via flexa Cometis:
 Jam non miramur barbati Phœnomena Astri.

Whose Courſe deſtroyed the *Ptolemaick World*,
 And all the Chryſtal Orbs in ruin hurl'd;
 Prov'd 'em fictitious, as in empty Space they } 70
 whirl'd.

So when a Minor King the Scepter Sways,
 (Some Kings, alas! are Minors all their Days)
 How hard's the Task, how great muſt be the Pains
 For envi'd Regents to direct the Reins?
 While jarring Parties rend the ſinking State, 75.
 Machines, by Art, muſt bear the tott'ring Weight;
 Stateſmen perplex'd, with their Invention rack't,
 One Day make Edicts, and the next retract;
 The Coin, to Day, ſhall in its Value riſe,
 To morrow, Money ſinks and Credit dies; 80.

One Year the Minds are rais'd by specious Schemes,
 The next, are wak'd from all their golden Dreams :
 And now th' Expedient is a Foreign War;
 And now soft Peace can ne'er be bought too dear ;
 And now the Work is done by Plots and Panick
 Fear. 85.

But bright *Urania*, heavenly Virgin, say,
 How th' ancient System made again its Way,
 And, that Consistency might be restor'd,
 The *Sun* became, once more, the central Lord;
 What Praises to *Copernicus* are due, 90.
 Who gave the Motions, and the Places, true ;
 But what the Causes of those Motions were,
 He thought himself unable to declare.

Cartesius

Cartesius after, undertook in vain,
 By *Vortices*, those Causes to explain; 95.
 With fertile Brain contriv'd, what seem'd to be
 An easy, probable, Philosophy;
 No conjuring Terms or *Geometrick* Spells;
 His gentle Readers might be Beaux and Belles.

D 2

In

VERSE 94. *Cartesius* after, undertook, in vain,
 By *Vortices*, those Causes to explain.

Cartesius said, that the whole *Mundane* Space was full of Matter; and that in our System, the *Sun* in revolving upon its *Axis*, carried the *Celestial Matter* about it round in a *Whirl Pool*, or *Vortex* (*Tourbillon*) which Matter in its Motion carried all the *Planets* round the *Sun*; but that every *Planet* had at the same time a small *Vortex* moving about it as it turn'd on its *Axis*, whereby it made some of the Bodies about it fall on its Surface, and carried others round. The *Earth*, for Example, and *Jupiter* and *Saturn* (as he said) moved their *Satellites* by their particular *Vortices*.

NOT knowing that Comets returned again or revolved in Orbits, He asserted that they were only *Planets* flying from one System to another, when one great *Vortex* got ground of another; for he gave each fix'd *Star* a *Vortex* and *Planets* to go round it, believing with the rest of the Modern *Philosophers* that every fix'd *Star* is a *Sun*. But Sir *Isaac Newton*, and other *Mathematicians* and Experimental *Philosophers* have shewn the Motion of *Planets* in *Vortices*, to be inconsistent with Observations and Appearances, and a *Plenum* in Nature to be impossible.

In *Plato's* School none cou'd admitted be, 100.
 Unless instructed in *Geometry*;
 But here it might, (nay must) aside be laid,
 And Calculations that distract the Head.
 Thus got his Vogue the Physical Romance,
 Condemn'd in *England*, but believ'd in *France*; 105.
 For the bold *Britons*, who all Tyrants hate,
 In Sciences as well as in the State,
 Examin'd with experimental Eyes,
 The *Vortices* of the *Cartesian* Skies,
 Which try'd by Facts and *mathematick* Test, 110.
 Their inconsistent Principles confes'd,
 And jarring Motions hast'ning to inactive Rest. }

But

But *Newton* the unparallel'd, whose Name
 No Time will wear out of the Book of Fame,
 Cælestial Science has promoted more, 115.
 Than all the Sages that have shone before.
 Nature compell'd, his piercing Mind, obeys,
 And gladly shews him all her secret Ways;
 'Gainst *Mathematicks* she has no Defence,
 And yields t' experimental Consequence: 120.

His

VERSE 113. But *Newton* the unparallel'd, whose Name
 No Time will wear out of the Book of Fame,
 Cælestial Science has promoted more,
 Than all the Sages that have shone before.
 Nature compell'd, his piercing Mind, obeys,
 And gladly shews him all her secret Ways;
 'Gainst *Mathematicks* she has no Defence,
 And yields t' experimental Consequence:
 His towering Genius, from its certain Cause, &c.

SEE Dr. *Halley's* Verses before mentioned

Quæ toties animos veterum torfere sophorum
 Obvia conspicimus-----

Talia

His tow'ring Genius, from its certain Cause,
 Ev'ry Appearance, a *priori* draws,
 And shews th' *Almighty Architect's* unalter'd
 Laws.

That *Sol* self-pois'd in *Æther* does reside,
 And thence exerts his Virtue far and wide; 125.
 Like

Talia monstrantem celebrate-----
 NEWTONUM clausi referantem scrinia veri-----
 Intima panduntur victi penetralia Cæli-----
 ----nubem pellente mathesi,
 Quæ Superum penetrare domos, atque ardua cæli,
 Scandere sublimis genii concessit acumem.

VERSE 124. *That Sol self-pois'd in Æther does reside,
 And thence exerts his Virtue far and wide, &c.*

SEE Dr. Halley's Verses.

Sol folio residens ad se jubet omnia prono
 Tendere descensu, nec recto tramite currus
 Sidereos patitur vastum per inane moveri;
 Sed rapit immotis, se centro, singula gyris.

Like Ministers attending e'ery Glance,
 Six Worlds sweep round his Throne in Mystick
 Dance.

He turns their Motion from its devious Course,
 And bends their Orbits by Attractive Force,

His

VERSE 128. *He turns their Motion from its devious Course,
 And bends their Orbits by Attractive, &c.*

FROM the Laws of *Attraction* (or *Gravity*) Sir *Isaac Newton* has deduced effects which are found by Observation; and nothing besides the *mathematical Demonstration* it self) can be a more certain Proof of that *Attraction*, whose Laws and Manner of Acting, that incomparable Philosopher has explain'd, than to find that the Motion of the *Celestial Bodies*, answer exactly to the Effects that their mutual *Attractions* must produce.

THUS when it had been objected by some considerable Men against Sir *Isaac Newton*, that it would appear by the Motion of *Jupiter* and *Saturn* in their Conjunction (that is, as they pass by one another) that *Attraction* was a mere Supposition, *Astronomers* observed those *Planets* in and near the last Conjunction with so much the more Care, and found that they did so affect one another, as they came near, as to disturb each others Motion, and thereby shew their mutual *Attraction*; which Appearance cannot be observed in the inferior *Planets*, in respect to each other, because they are so small, and the *Sun* so large and so near them, that the Action of the *Sun* on them as He causes them to describe their Orbs, makes their Action on each other so insensible as to escape Observation.

Thus

His Pow'r, coerc'd by Laws, still leaves them

free,

130.

Directs but not Destroys, their Liberty;

Tho'

THIS will be better understood, by looking into the Cause of the Motion of the *Planets* and *Comets* round the *Sun*, which will be easily conceiv'd by any one, that will be at the Pains to read what follows with some Attention.

A Body once put into Motion, endeavours to continue in that State of Motion, and would for ever go on in a right Line, never coming to Rest, unless some other Force equal to the first, or several Forces (whose joint Actions are equal to the first Impulse) do, at once, or successively destroy its Motion.

A Body thus moving is said to go on with its *projectile* Force, from whose rectilineal Direction, it cannot be turn'd to move in a Curve, unless there be some other Force continually acting to turn it out of the right Line, and the Moment that such a Force ceases to act, the Body will fly out of the Curve in a right Line, called a *Tangent* to that Curve.

To illustrate this, let us suppose a Stone whirl'd round in a Sling before it be thrown forward; we are sensible, by the Pull which we feel, that the Stone is endeavouring to fly out of the Curve or Circle wherein we whirl it; and that that Force, with which it endeavours to get loose, is the greater, the swifter the Stone is whirl'd round. Such a Force is called *centrifugal*, and the Pull of the String which retains the Stone, is called a *centripetal* Force.

LET us suppose, for Example, that a Stone placed at the Point *A*. (Fig. 6.) has an Impulse given it in the Direction *AB*, but at the same Time is held by the String *SA*; instead of going to *C*, it will go to *D* in the

Tho' fast and slow, yet regular they move,
(Projectile Force restrain'd by mutual Love,)

E

And

the Curve $ADOB$. Since the Stone is drawn from C , (the Place which the *projectile* Force would have carried it to) to D , DC will represent the *centrifugal* Force, whereby it stretches the String in that Direction, and the Force of the String, or *centripetal* Force, which acts in the contrary Direction CD , will also be equal to the *centrifugal* Force.

Now let S represent the *Sun*, whose *Attraction* is instead of the Force of the String abovementioned; and A a *Planet*, whose Tendency is to move in the Line AB : It is evident from what has been said, that if the *Attraction* of the *Sun*, which gives the *Planet* a Tendency towards S , be so proportioned to the *projectile* Force of the *Planet*, as to carry it to D , it will turn it still out of its rectilineal Way, whereby it endeavours to fly off at D in the *Tangent* DE , and make it go on to O , and then to B , and so to AD , &c. so that it shall continually describe the Orbit $ADOB$.

If AD be an *Arc* of a Circle, of which S is the Center, the Curve $ADOB$ will be a Circle, and the *Planet* will move with equal swiftness in every Part of the Orbit. But if the *Attraction* had been greater in respect of the *projectile* Force, so as to draw the *Planet* out of its rectilineal way as far as d , then the Curve would have been an *Ellipse*, or Oval, and the *Sun* would have been in one of its *Foci* (or Centers, as the Workmen call them) and the *Planet* would have described one half of the Orbit, (*viz.* from the *Aphelion* to the *Perihelion*) with a Swiftness or Velocity, uniformly accelerated, and the other half of the Orbit, (*viz.* from the *Perihelion* to the *Aphelion*) with a Velocity uniformly decreasing.

BUT this will appear very plain, by looking on the 7th *Figure*, where the *Planet* at A , endeavouring to move in the *Tangent* Aa , is by the *Attraction* of the *Sun* S , drawn to B instead of M , at which Point being
nearer

And reigning thus with limited Command,
He holds a lasting Scepter in his Hand.

135

By

nearer the *Sun*, it is more strongly Attracted, and consequently accelerated; but as the *centrifugal Force*, is proportionable to the Swiftness of the Body carried round, the *Planet* endeavours to fly off in the *Tangent B b*, its *centrifugal Force* being increased in the same Proportion as the *centripetal Force*, or *Attraction* of the *Sun*. The *Planet* being more attracted as it comes nearer the *Sun* at *C, D*, and *P*, has also proportionably more *centrifugal Force*, arising from its increased Velocity; and continually increasing its Endeavour to fly off in the *Tangents C c, D d*, and *P p*, does thereby escape being drawn into the *Sun*.

WHEN the *Planet* which came from *A P*, the *Aphelion*, is got to *P*, the *Perihelion*; it moves through the Points *P, E, F, G*, quite to *A* with a retarded Motion, the *centripetal* and *centrifugal Forces*, equally and gradually decreasing in the same Manner as they increased before: For in this half of the Orbit, the Direction of the *Sun's attractive Force*, is contrary to (or at *obtuse Angles*, with) the Direction of the *projectile Force*, as appears most plainly at the Points *C*, and *F*, *S C* the Direction of the *Sun's Attraction*, making an acute Angle with the *Tangent C c*, when the *Planet* is at *C*; but when the *Planet* is at *F*, *S F* the Direction of the *Sun's Attraction* makes an obtuse Angle with the *Tangent F f*, therefore the *projectile Force* in the Direction *F f*, is less than it was in *E e* and *P p*, but greater than in *G g*, or *A a*.

N. B. *S* is one Focus of the Ellipse, and *Z* the other.

IT is evident, that the longer (or the more *excentrick*) the Ellipse is, the greater will be the Difference of Velocity. This is not very sensible in the *Planets*, whose elliptick Orbits differ but little from Circles, but yet enough to fall under Observation; for it is owing to this that our Summer is eight Days longer than our Winter; but in Comets, which move in very long Ellipses, the Motion is incredibly swift in the *Perihelion*, and as slow proportionably in the *Aphelion*; the Comet which appeared
in

By his Example, in their endless Race,
 The *Primaries* lead their *Satellites*,
 Who guided, not enslav'd, their Orbits run,
 Attend their Chiefs, but still respect the *Sun*,
 Salute him as they go, and his Dominion
 own.

140.

E 2

Comets,

in 1680, and 1681, describing in less than a Year, all that Part of its Orbit in which it was visible to us; though its whole Revolution is not performed in less than 575 Years.

VERSE 137. *The Primaries lead their Satellites,
 Who guided, not enslav'd, their Orbits run,
 Attend their Chiefs, but still respect the Sun,
 Salute him as they go, and his Dominion own.*

Saturn, Jupiter, Mars, the Earth, Venus and Mercury, are called Primaries, or Primary Planets, because they move round the Sun; but the five Moons, or Planets which move about Saturn, and the four which move about Jupiter, and the Moon which goes round our Earth, as they all attend their Primaries in their Revolution about the Sun, are called the Secondary Planets, or Satellites.

Now these *Satellites* are kept in their Orbits, by the *Attraction* of their *Primaries* and hindered from flying out in a straight *Line* or *Tangent*, in the same manner as the *Primaries* are carried round the *Sun*, as has been explain'd

Comets, with swiftnefs, far, at distance, fly,
 To seek remoter Regions in the Sky;
 But tho' from *Sol*, with rapid hafte, they roll'd,
 They move more flowly as they feel the Cold;

Lan-

explain'd in the laft Note. This Motion of the *Satellites* would be entirely regular, were it not for the *Sun's Attraction*, which (though it is not near enough to hinder them from going round their *Primaries*) disturbs their Motions; as is very evident in the *Moon*, which moves with more or lefs Velocity, and whose Orbit becomes more or lefs Convex according to its Position in refpect of the *Sun*: And that feeming Irregularity of the *Moon*, is fo various and intricate that no Body could invent any tolerable *Hypothesis* to folve it, or Numbers to exprefs it, till Sir *Isaac Newton* demonstrated every Appearance and Motion of that variable *Planet* to be the Effect of the mutual Attraction of the *Sun*, *Earth*, and *Moon*, according to the different Positions of thefe three Bodies. See Dr. *Halley's* Verfes, before Sir *Isaac Newton's Principia*.

Discimus hinc tandem, qua caufa argentea Phœbe,
 Paffibus haud æquis graditur, cur fubdita nulli
 Haftenus Aftronomo numerorum frœna recuset.

VERSE 141. Comets, with fwiftnefs, far, at diftance, fly,
 To seek remoter Regions in the Sky.
 But tho' from Sol, with rapid hafte, they roll'd,
 They move more flowly as they feel the Cold;

Languid

Languid, forlorn, and dark, their State they
moan, 145.

Despairing when in their *Aphelion*:

But *Phæbus*, soften'd by their Penitence,

On them benignly sheds his Influence,

Recalls the Wanderers, who slowly move

At first, but hasten as they feel his Love: 150

To

Languid —————
————— *in their Aphelion.*

As Comets move from their *Perihelion* (or their nearest Place to the *Sun* in their Orbit) to the *Aphelion* (or greatest Distance from the *Sun*), they begin their Motion with great Celerity, but go on slower and slower till they come to the *Aphelion*, from whence their Motion continually increases till they come back to the *Perihelion*; just as a Cannon Ball shot upwards, being attracted by our Earth, moves slower and slower, till it be got up to its utmost Height, from whence it decends with an accelerated Motion. See the last Note but one, where we have explain'd the Motion of a Comet.

To him for Mercy bend, sue, and prevail;
 Then Atoms crowd to furnish out their Tail.
 By *Newton's* help, 'tis evidently seen
 Attraction governs all the World's Machine.

But now my cautious Muse consider well 155.
 How nice it is to draw the Parallel:

Nor

VERSE 151. *To him———bend———prevail;
 Then Atoms crowd to furnish out their Tail.*

As Comets begin to come near the *Sun*, their Orbit which was almost in a right Line, bends very quick; and as they approach the *Sun* its great Heat makes the Comet throw out a Vapour, or Exhalation, in great Quantity, which Vapour is always carried in a Direction opposite to the *Sun*, and being shin'd upon by the *Sun*, gives a View of what is called the Comets Tail, which Tail is of a prodigious Length, just after the Comet had passed the *Sun*, if the Comet went very near it; as happen'd to the Comet seen in 1680, and 1681, which passed so very near the *Sun's* Surface as to receive a Degree of Heat 2000 times greater than our culinary Fires (or Iron when it is red hot) and to throw out a Tail as long as the Distance from the *Earth* to the *Sun*, which is above 80 Millions of Miles.

As

Nor dare the Actions of crown'd Heads to scan:

(At least within the Memory of Man)

If th' Errors of *Copernicus* may be

Apply'd to ought within this Century, 160.

When e'er the want of understanding Laws,

In Government, might some wrong Measures
cause,

His Bodies rightly plac'd still rolling on,

Will represent our fix'd Succession,

To which alone th' united *Britons* owe, 165.

All the sure Happiness they feel below.

Nor

As the Comet recedes from the Sun, its apparent Magnitude decreases, till at last both Comet and Tail become invisible, when they are about as far from us as *Jupiter*, but still we must make allowance for the bigness of the Comet, some being nearly as big as the Earth, and others very little bigger than the *Moon*.

Nor let the Whims of the Cartesian Scheme,
 In Politicks be taken for thy Theme,
 Nor say that any Prince shou'd e'er be meant,
 By *Phæbus*, in his *Vortex*, indolent, 170.
 Suff'ring each Globe a *Vortex* of his own,
 Whose jarring Motions shook their Master's
 Throne,
 Who governing by Fear, instead of Love,
 Comets, from ours, to other Systems drove.
 But boldly let thy *perfect Model* be, 175.
NEWTON's (the only true) *Philosophy*:
 Now sing of Princes deeply vers'd in Laws,
 And Truth will crown thee with a just Applause;
 Rouse

VERSE 174. *Comets, from ours, to other Systems drove.*

SEE the Note on Verse 94, concerning *Cartesius's* Account of Comets.

Rouse up thy Spirits, and exalt thy Voice
 Loud as the Shouts, that speak the People's
 Joys; 180.

When M A J E S T Y diffusive Rays imparts,
 And kindles Zeal in all the *British* Hearts,
 When all the Powers of the Throne we see
 Exerted, to maintain our *Liberty*:

When Ministers within their Orbits move, 185.

Honour their King, and shew each other Love:

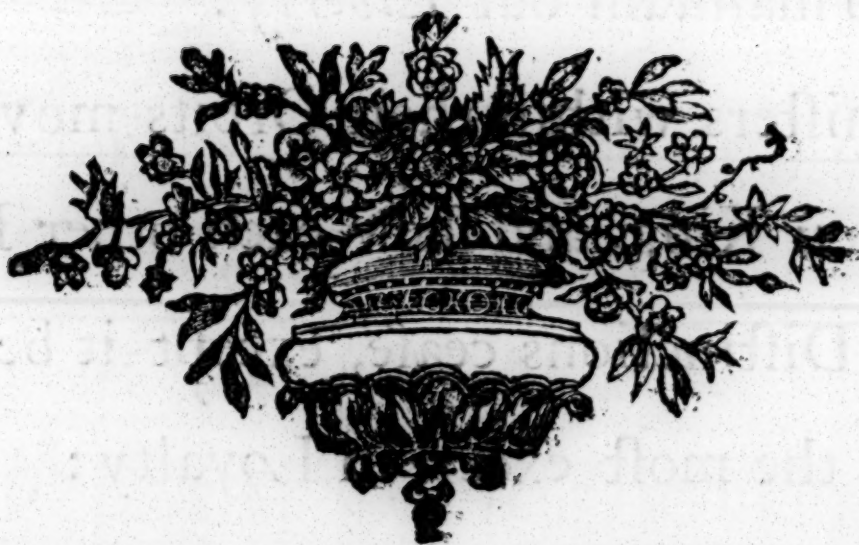
When all Distinctions cease, except it be

Who shall the most excell in Loyalty:

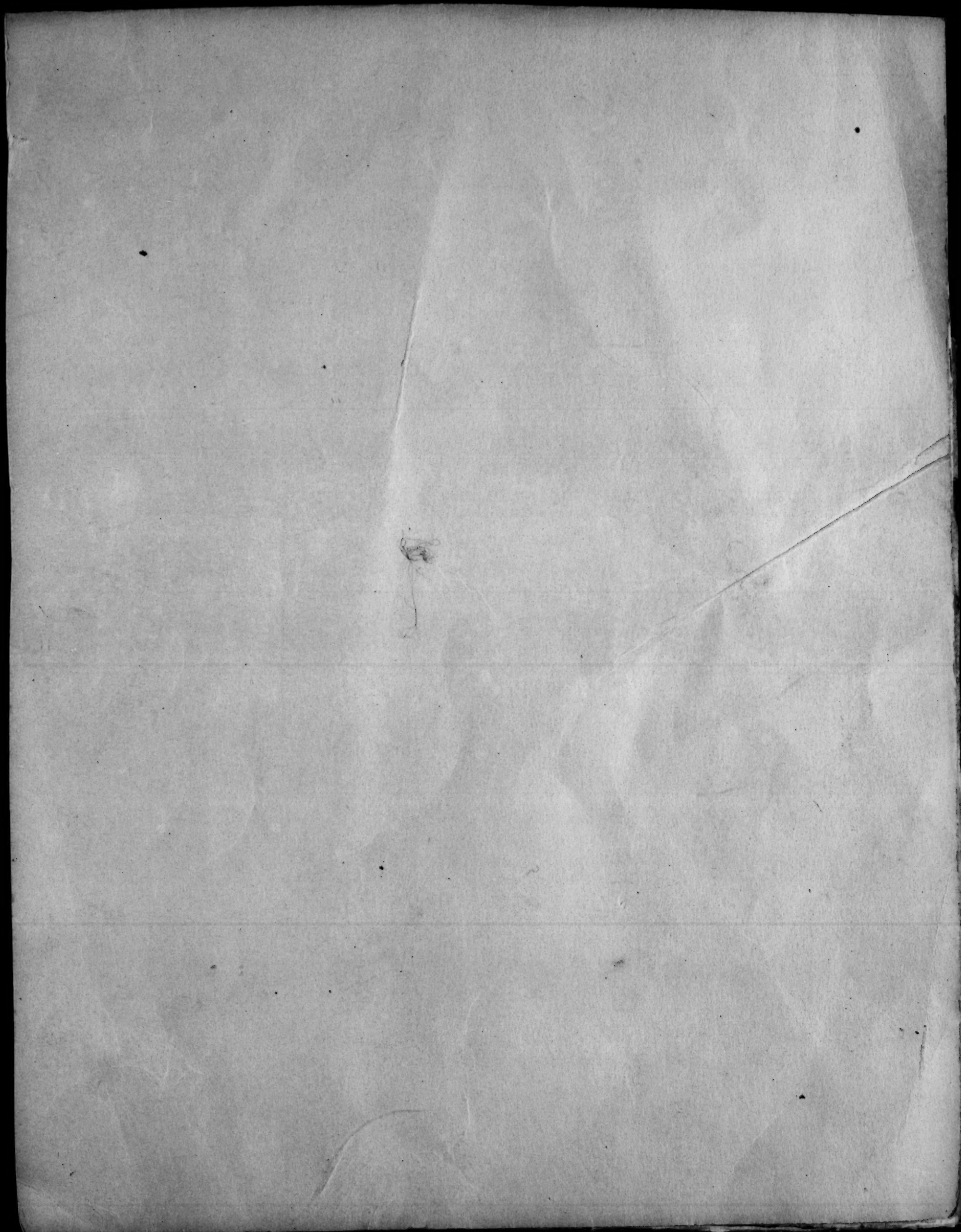
Comets from far, now gladly wou'd return,

And, pardon'd, with more faithful Ardour
 burn. 190.

ATTRACTION now in all the Realm is seen,
To bless the Reign of *GEORGE* and
CAROLINE.



LEAP



The Copernican
System of

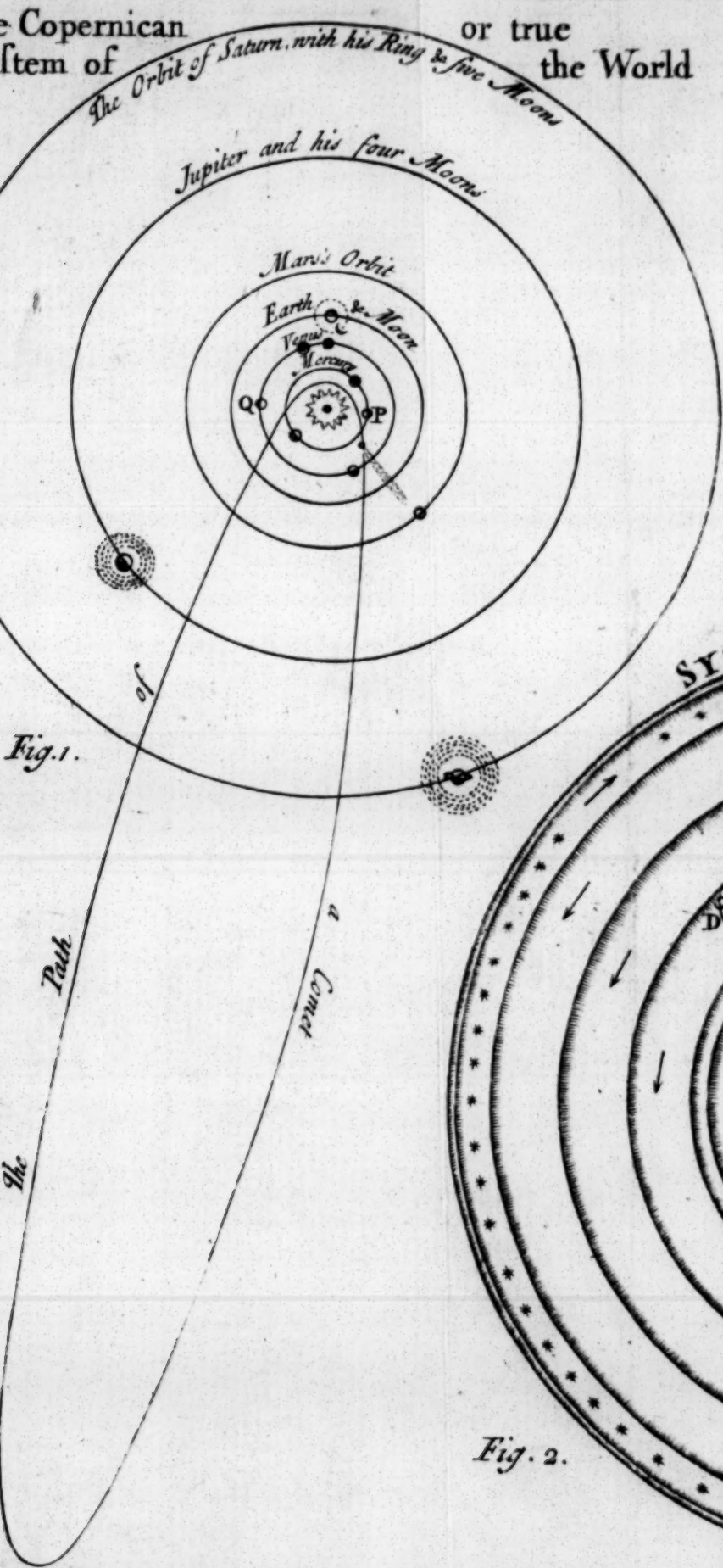


Fig. 1.

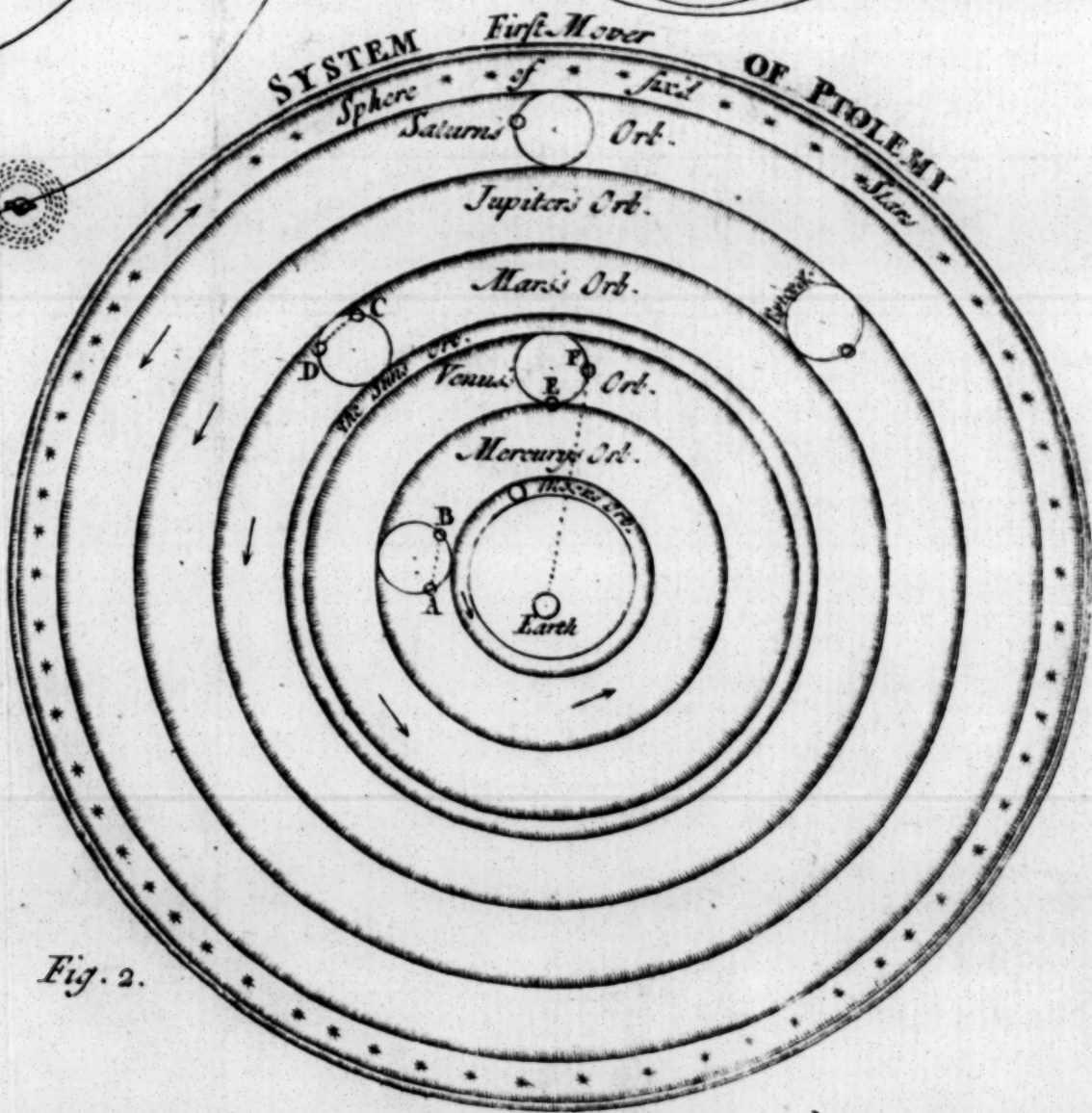
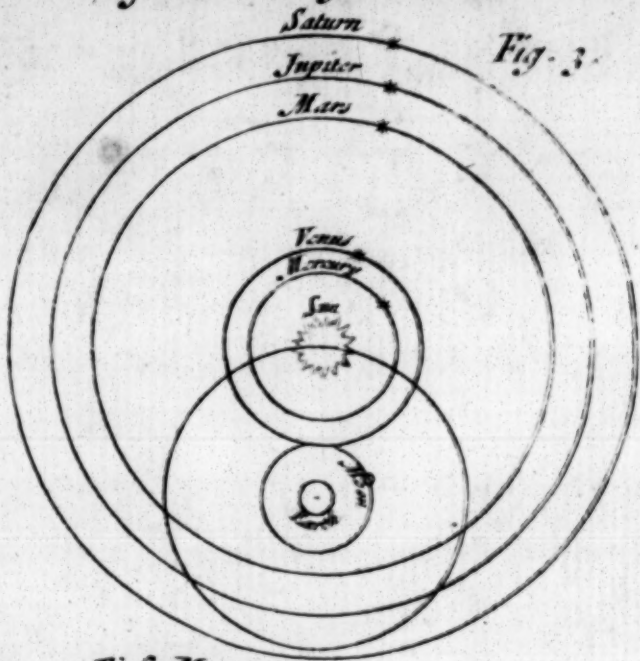
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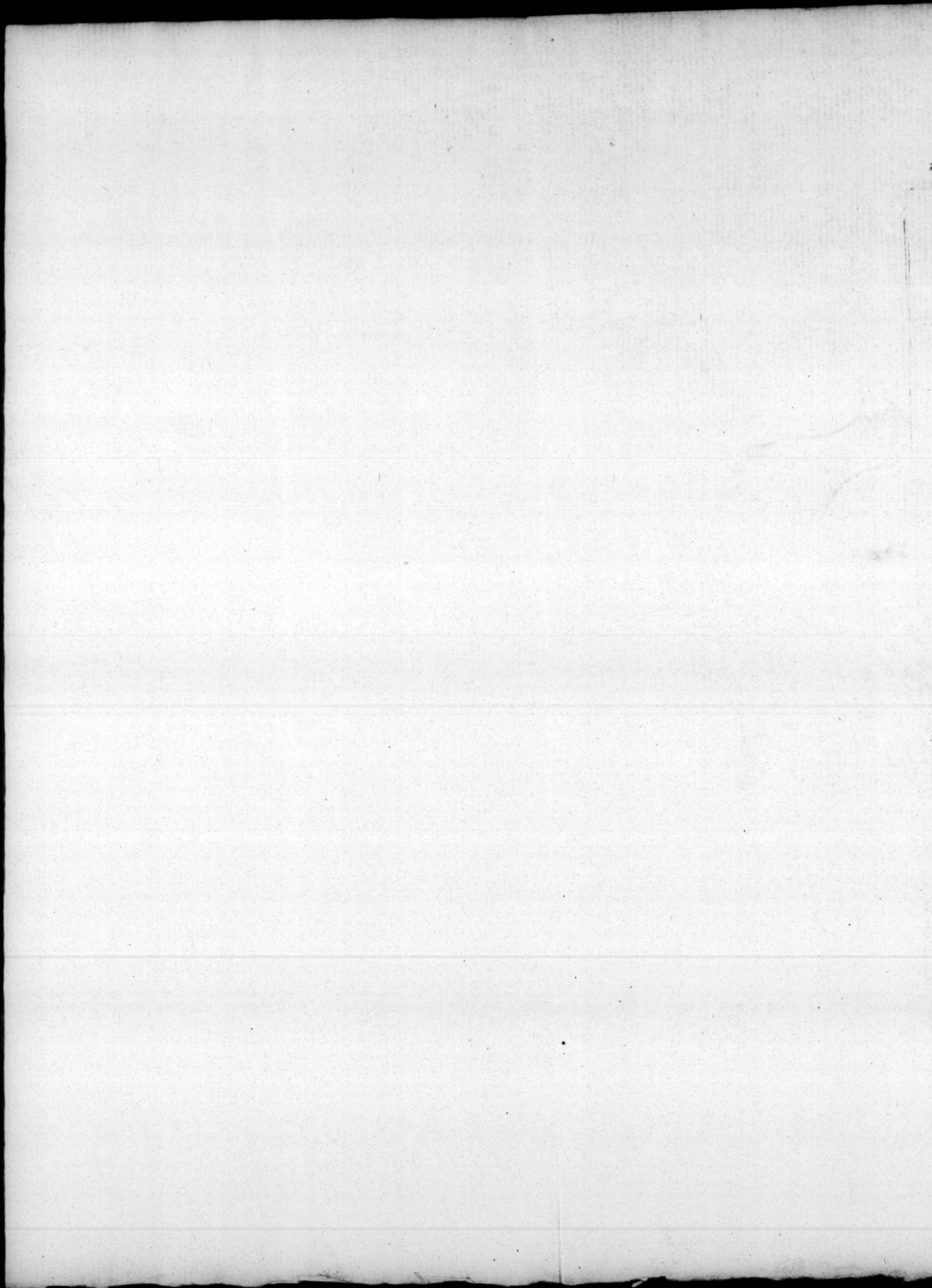
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the Copernican System of or true the World



System of Tycho Brahe





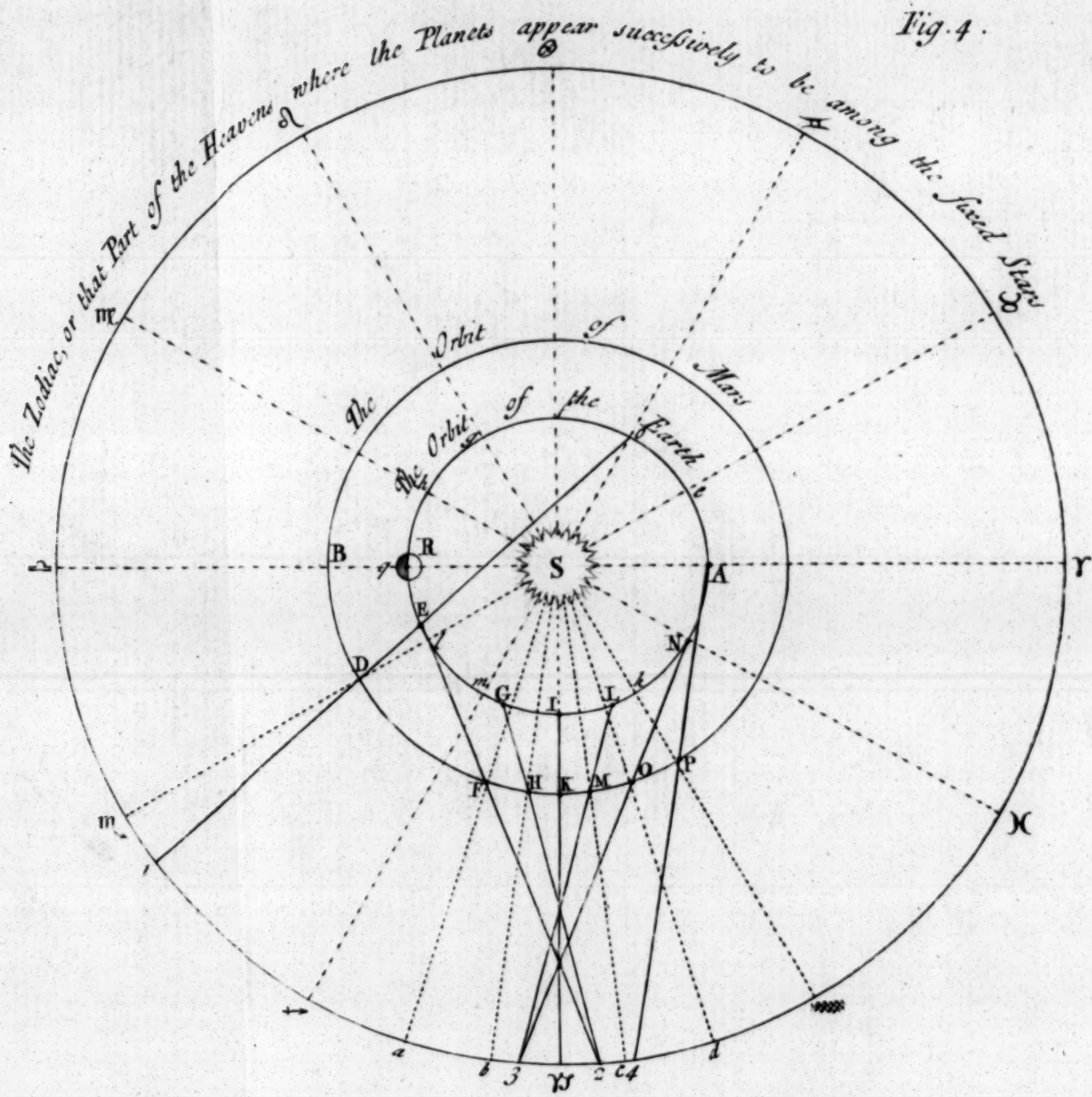
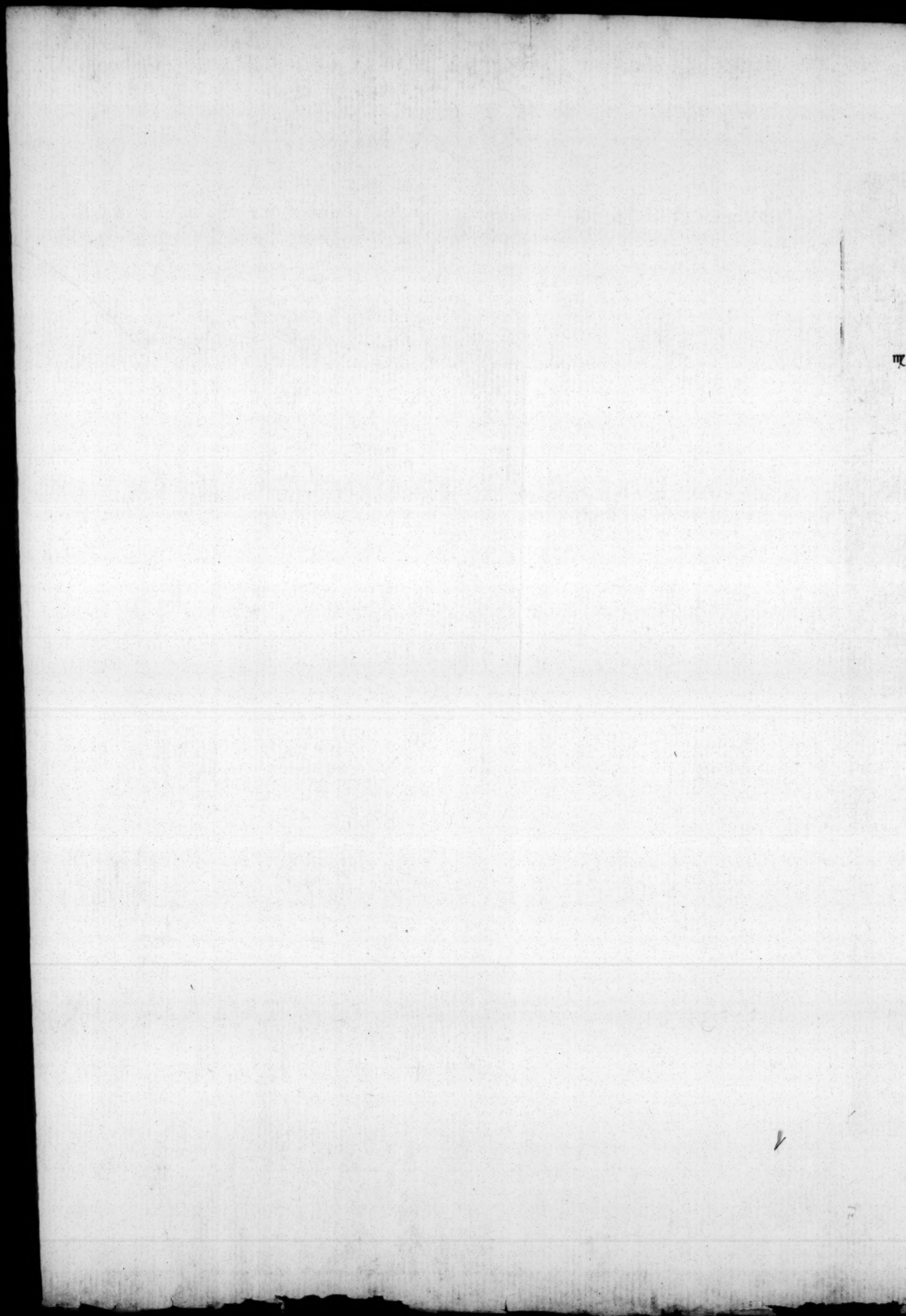


Fig. 4.



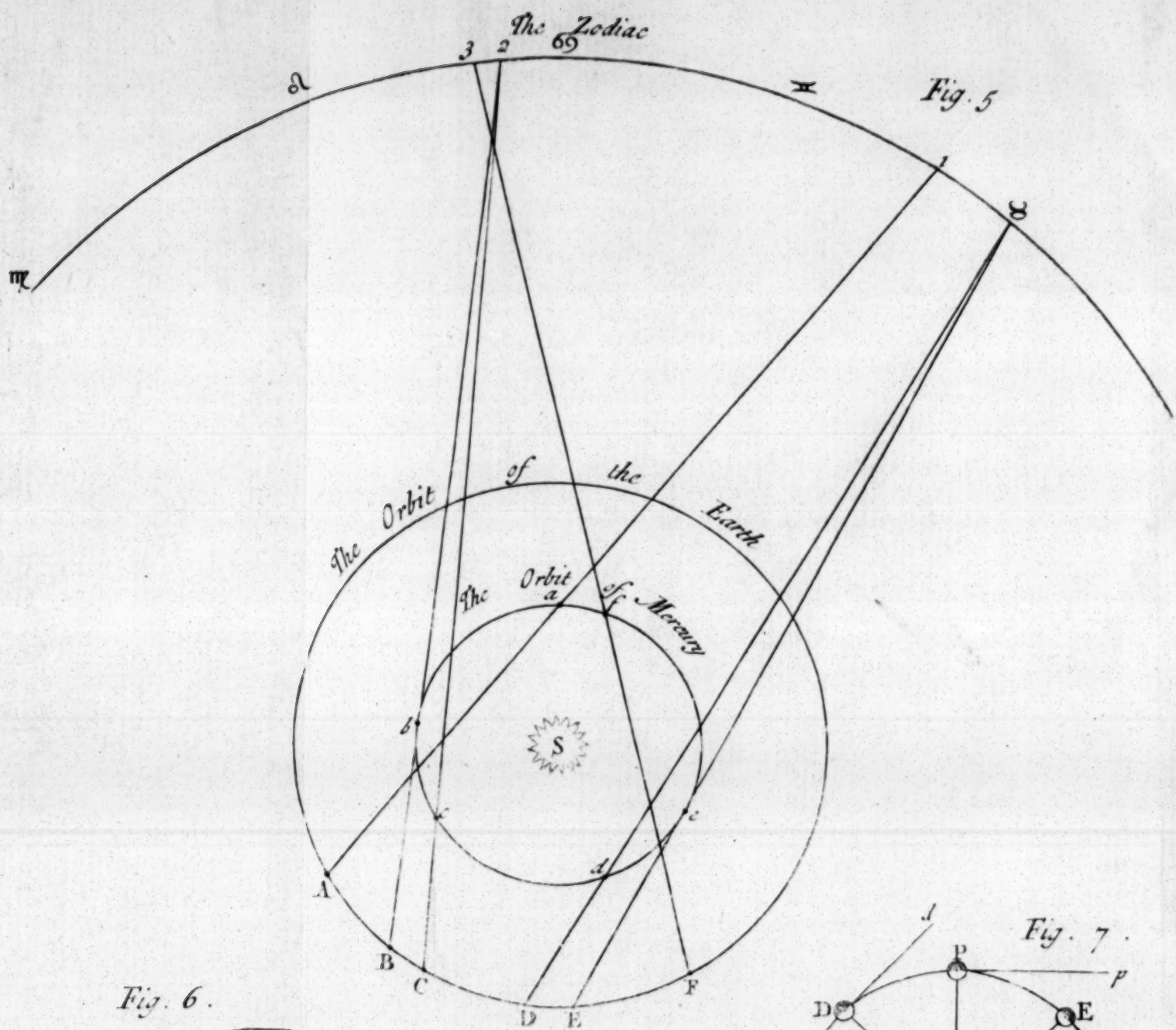


Fig. 6.

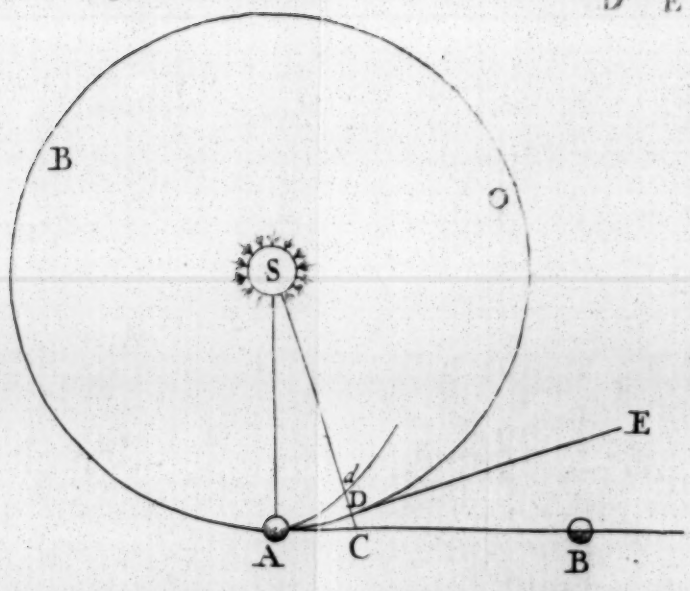
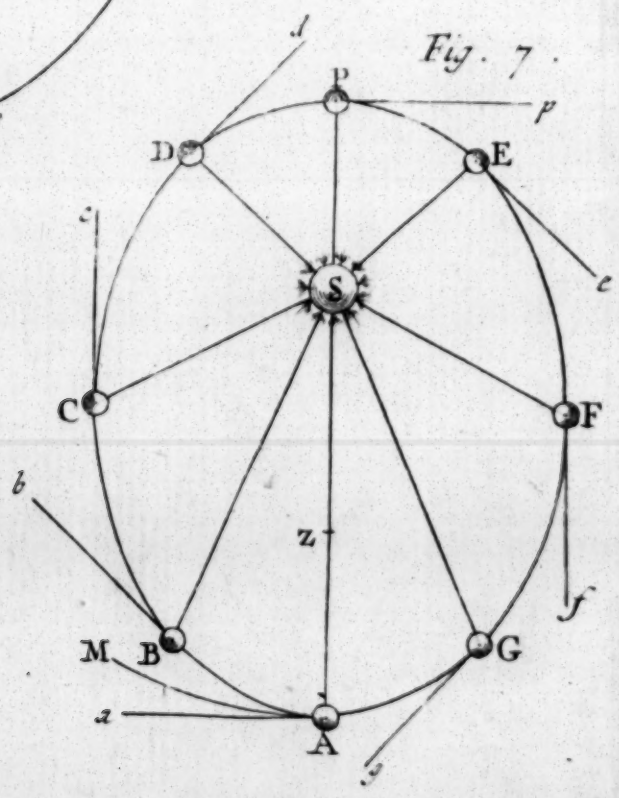
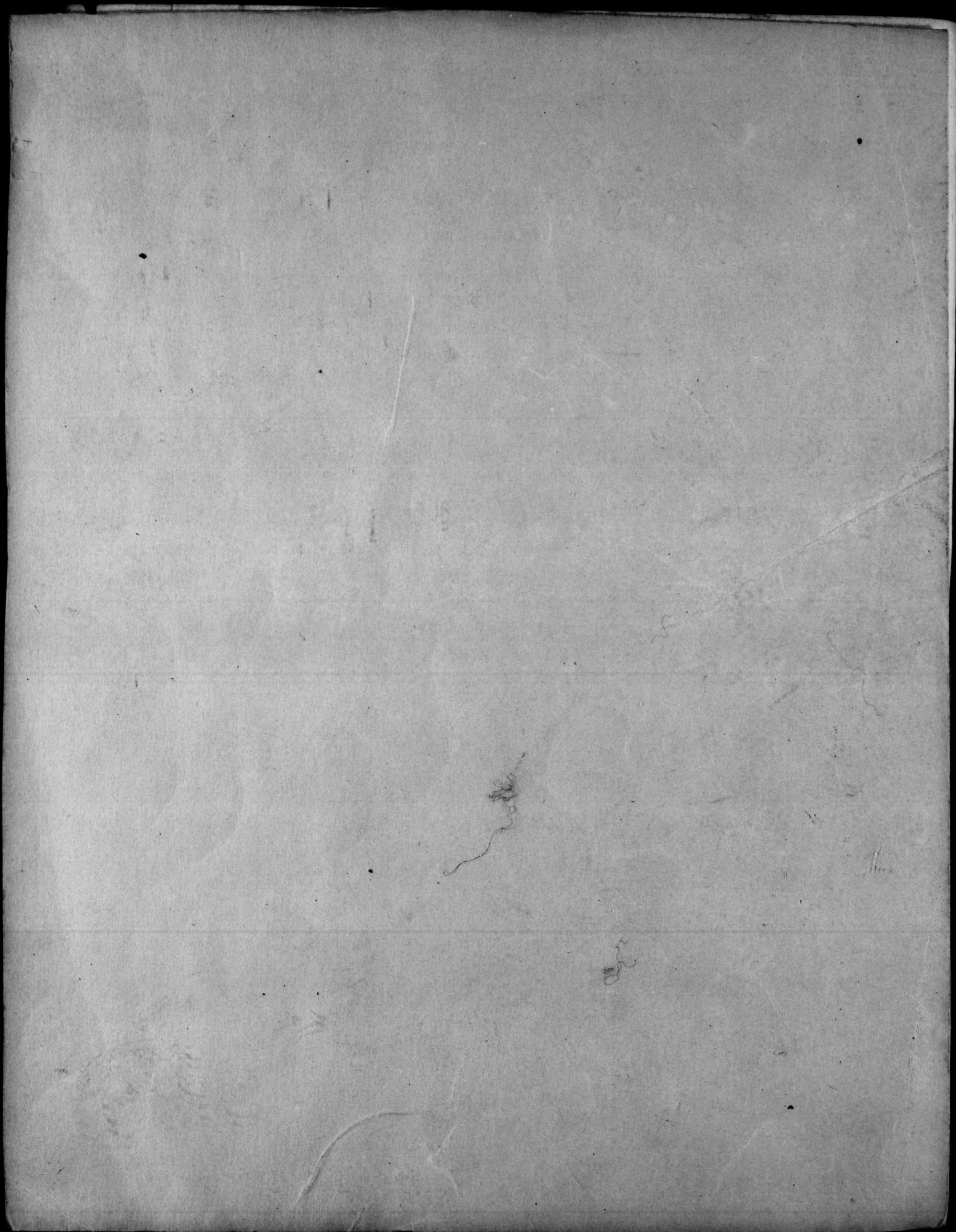


Fig. 7.







LEAP-YEAR:

O. R,

Cambria's Complaint

Against the

INTERCALARY DAY.



THREE Winters *Cambria* had with Plea-
sure view'd,

How *Rhedycina's* learned Pillars stood ;

F 2

Wolsey's

VERSE I. *Three Winters Cambria had with Pleasure view'd*
How Rhedycina's learned Pillars stood.

Cambria (Wales) is supposed to have been viewing the Draughts in the *Oxford Almanacks* for the three last Years, and now to be casting her Eyes on what is represented in the Almanack for this Year 1728, before She looks for Her M A J E S T Y's Birth-Day in the Calendar below.

Wolsey's and *Fox's* Domes rejoyc'd to scan,
 And pitied *Lancaster's* unfinish'd Plan.
 As Seasons roll'd she saw with gladsome Eyes 5.
 Beside great *Chicheley's* Walls new Wonders rise :
 Bounty and Art at once engag'd her Mind,
 How *Codrington* bestow'd, and *Clark* design'd.
 Hard by she spied young *Henry*, as he sat,
 By Guards furrounded, in his Chair of State; 10.
 Of

VERSE 3. *Wolsey and Fox's Domes* ———

Christ-Church and Corpus Christi Colleges.

VERSE 4. *And pitied Lancaster's unfinish'd Plan.*

Queen's College, whose Plan was contrived, and in Part executed by the late Dr. *Lancaster*; but left unfinished for want of sufficient Benefactions.

VERSE 6. ——— *New Wonders* ———

The new Buildings at All-Souls College.

VERSE 9. ——— *young Henry* ———

King *Henry* the Sixth, who granted Archbishop *Chicheley* the Patent for founding *All-Souls* College, and the said Archbishop, are drawn in the *Oxford Almanack* for the present Year.

Of warlike Sire a weak unactive Son,
 Who hapless lost more than her *Monmouth* won.
 Long she beheld, as long as she could spare
 Her Thoughts intent upon a nearer Care;
 Then of the charming Piece her Leave she took, 15.
 And underneath it cast a wistful Look;
 Eager to trace how soon the Morn wou'd shine,
 Sacred to *DAVID* and to *CAROLINE*.
 But with what Rage possess'd, when in the Way
 She found a supernumerary Day! 20.

Frowning

VERSE 20. *She found a supernumerary Day.*

According to the *Julian Account*, which we observe in *England*, the
 24th Day of *February* is reckoned twice in the *Bissextile* or *Leap-Year*,
 which makes that Month to have 29 Days, and changes the *Dominical*
 (or *Sunday*) Letter. ——— Whereas in other Years *February* has but 28
 Days, and the *Dominical* Letter continues the same during the whole
 Year.

Frowning, the Goddeſs rais'd her awful Head,
And with becoming Paſſion thus ſhe ſaid.

Impertinent of Days, what doeſt thou here,
More to diſturb, than to adjust the Year?
Puzzling *Matthias*, whether he ſhall keep 25.
His wonted Station, or conſent to *Leap*.
And were this all, I cou'd with this diſpenſe,
But not with that audacious Infolence,
Which ſhoves *Menevia*'s Prelate farther down,
And braves the beauteous Conſort of the Crown. 30.

Whilst

VERSE 25. *Puzzling Matthias.*

The *Oxford Almanack* and ſome others make the 25th of *February* to be *St. Matthias's* Day this *Biſſextile* Year; whilst the reſt of the *Almanacks* make it the 24th.

VERSE 29. —————*Menevia*—————

The City of St. David's in Wales.

Whilst my dear *Britons* dutifully seek
 With Pains to cultivate the fragrant Leek,
 And flowing Bowls prepare to hail their Queen,
 Thou, sacrilegiously, stepp'st in between.
 If we to sage Astronomers should yield, 35.
 That these Intercalations must be held;
 Cou'd blooming *April* not afford thee Place,
 Or cou'dst thou not creep in at *Michaelmas*?
 Well had'st thou clos'd the Month that follows:
May,
 And giv'n the *Sunday* Letters equal Play : 40.
 Or,

VERSE 37. Cou'd blooming April ———
 ———— *Michaelmas,*
 ———— the Month that follows May.
 ———— *Scotia's Saint.*

April, June, September, and November having only 30 Days each, any one
 of them might have received the *Intercalary Day*, and our *Leap-Years* have
 continued the same, as to the Way of reckoning.

Or, rather than my Fav'rite to supplant,
 Well had'st thou waited upon *Scotia's* Saint:
 As *Scotia*, with her Hardships finding Fault,
 Instructs her Sons to watch the Tax on Malt;
 Mine against thee a worse Complaint shall
 bring, 45.
 Attentive to my Voice, while thus I sing.

When Ignorance prevail'd, in Times of old,
 Popes had with living Emperors been bold:
 In a more knowing Age *Gregorius* bred
 Esteem'd it safer to attack the Dead; 50.
 Of

VERSE 49. ———Gregorius———
 ———mend the Errors of the Julian Style.

The *Julian Style* derives its Name and Institution from *Julius Caesar*: He observing the *Egyptian Year* to get before the *Tropical*, or *Natural Year*, because the 6 Hours it wants of the *Tropical* are intirely neglected in its Constitution,

Of long-worn Lawrels *Cæsar's* Brows to spoil,
And mend the Errors of the *Julian* Style.

G

Five

stitution, did therefore add those 6 Hours to each *Julian Year*; so that a *Julian Year* consists of 365 Days, 6 Hours, and because this Quarter of a Day can't be consider'd or taken Notice of in *Civil Use*, he order'd the 6 Hours to be neglected till they made a Day, which happening every fourth Year, was to be inserted, by Way of *Intercalation*, between the 23^d and 24th of *February*; therefore from that time they write the Sixth of the *Calends* of *March* twice, from which the *Year* had the Name of *Bissextile*. But as to this *Julian Year*, the Quantity of it must be own'd to be too big, on which Account, the Beginning of this *Year* also, by little and little, creeps forwards in regard of the *Seasons*, or (which is all one) the times of the *Equinoxes* and *Solstices* go backward in regard of the Days of this *Year*. And since this Regress is about 10⁴ Minutes every Year, in about 133 Years it will be about a Day, and consequently from the *Year* of *Christ* 325, wherein the *Council* of *Nice* was held, to the *Year* 1582, wherein *Pope Gregory* reform'd the *Calendar*, this Regress amounted to 10 Days. Hence it came to pass, that whereas in the time of the *Nicene Council*, the *Vernal Equinox* happened near about the 21st of *March*; in the *Year* 1582, it was found to be about the 11th of *March*: That he might therefore bring the *Equinox* to its former Place, 10 Days were suppress'd in the Month of *October*, in the *Year* 1582, and the 5th Day was call'd the 15th; by this means, what would otherwise have been the 11th of *March* following, becomes the 21st of *March*; that is, the *Equinox* happens the same Day as it did in the time of the *Council* of *Nice*. And that the like *Variation* might not happen again, the said *Pope* order'd, that once in 133 Years, a Day should be taken out of the *Calendar*, or (which comes to the same) that three Days should be taken out every four hundred Years; and this he appointed to be done, by making every hundredth Year of the *Christian Era* common; which, according to the *Julian Account*, is always *Bissextile*, but every four hundredth Year to continue *Bissextile*, as in the *Julian Account*. This Form of the Year, settled by *Pope Gregory XIII.* was call'd from him the *Gregorian*, and is observed in

Five Solar Cycles are but lately run,
 Since first the Pontiff's New Account begun;
 Since proud *October* came, and vain of Praise, 55.
 Boasted his Num'rous, tho' Declining Days,
 His Foot scarce fix'd, when he was smitten low,
 Stunn'd with the Weight of a destructive Blow.

Ten

In Italy, France, Spain, Germany, and wheresoever the Authority of the Pope did then reach. In the Year 1700, which was Bissextile with us in England, the Intercalary Day was left out by those that use the Gregorian Account, which made it a common Year, and causes their present Reckoning to be 11 Days before ours.

VERSE 53. *Five Solar Cycles*—————

The Cycle of the Sun is 28 Years, and it is now 146 Years since the *Gregorian Account* begun.

VERSE 55. ————— *proud October*—————

See the last Note but one.

Ten Sacred Worthies fell ; so *Rome* despis'd,
So dropp'd the Honours of the Canoniz'd. 60.

The fatal Stroke *Calixtus* overtook,
And *Francis* might almost shake Hands with
Luke :

Unnumber'd Birth-Days off at once were swept,
And many a Wedding-Night flipp'd by unkept.
Had such a Chasm of Time with us been made, 65.
Bless'd, as we are, with Opulence and Trade ;

G 2

How

VERSE 59. ——— Ten sacred Worthies fell ———

The *Romanists* having Saints or Worthies for every Day, the Ten who pass unobserv'd that Year from the 5th to the 14th of *October*, were these, *St. Placidus*, *St. Bruno*, *St. Marc* the Pope, *St. Bridget*, *St. Dennis*, *St. Paulinus*, *St. Veniens*, *St. Nicassus*, *St. Geraldus*, and *St. Calixtus*.

VERSE 62. And *Francis* might almost shake Hands with *Luke*.

St. Francis on the 4th, and *St. Luke* on the 18th of *October*, by the sinking of 10 Days, were brought within 3 Days of one another.

How sorely had we felt our selves distress'd
 In Landed and in Money'd Interest ?
 Bills, Bonds and Leases wou'd have shifted Date,
 " Affording Matter strange for Law-Debate; 70.
 Tenants had murmur'd at Approach of Rent,
 And all our Stocks had varied Two *per Cent.*

Fain wou'd I act with Caution, and with Ease
 To scrupulous and tender Consciences;
 Fain make a Reconciling Step to *Rome*, 75.
 Yet not bring back a Rag of Pop'ry home;
 One Common Form of Reck'ning introduce,
 But leave the Toleration still in Use.

Haste

VERSE 76. *Yet not bring back a Rag of Popery home.*

The *Roman* and *English* Style may certainly be reconcil'd, without any Danger of imbibing any *Popish* Doctrines in Religion.

Haste then, my Patriots, to your Seats repair,
 And when assembled in full Numbers there, 80.
Resolve, without one contradicting *Nay*,
 To wreak my Vengeance on this Trayt'rous Day;
 Strictly oblige the Wretch to disappear,
 Proscrib'd and banish'd from the *British* Year.
 Yet let him still have Justice mix'd with Grace, 85.
 And, proper Penance done, resume his Place.
 Let no *Bissextile* here be seen again,
 'Till GEORGE has equall'd Great ELIZA's
 Reign.

This

VERSE 88. 'Till GEORGE has equall'd great ELIZA's Reign.

If his present MAJESTY reigns as long as Queen *Elizabeth*, that is
 44 Years, and there be no Leap-Years in that Time, our Reckoning will
 advance 11 Days, and bring our Style to agree with the *Gregorian*: And
 if his MAJESTY reigns longer, as our boundless Wishes may make us
 hope, he will (if our Expedient be allow'd of) live to see the same STYLE
 made use of over all the *Christian* Part of EUROPE.

This will insensibly compose the Jars
 Betwixt the Two contending Calendars. 90.
 And may our Aims, to make *their* Quarrel cease,
 Prove a sure Omen to *Europa's* Peace.

S. I. N. I.



This

Verse 88. THE GEORGE

If his present Majesty reigns as long as Queen Elizabeth, that is
 44 years, and there be no Leap-Years in that Time, our Reasoning will
 advance 11 Days, and bring our Style to agree with the Quakers: And
 if his Majesty reigns longer, as our honest Wives may make us
 hope, he will (if our Reasoning be allowed) live to see the same Style
 made use of over all the Christian Part of the World.



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unavoidable Disappointments, not proper to be mention'd here; but
that he has now resumed the Work, and will finish it with all Ex-
pedition.



The *Reader* is desir'd to correct the following

ERRATA.

PAGE 2. line 5. for *their* read *the*. P. 6. line 24. for
though read *thought*. line 27. for *the* read *two*. P. 7.
line 12. for *comes* read *come*. P. 12. line penult. for *K* read *k*.
P. 22. line 12. for *acumcm* read *acumen*. P. 23. line 9. for *no-*
thing besides read *nothing (besides*. P. 25. line 15. for *to AD* read *to*
A, D. P. 26. line 12. for *from AP* read *from A*.

